WE CLAIM AS OUR INVENTION:

1. A method for determining and documenting, from current image data, x-ray exposure values employed for producing an x-ray exposure or an x-ray image acquisition sequence in an x-ray diagnostic apparatus, comprising the steps of:

electronically irradiating a radiation detector with x-rays to expose an exposed image region comprised of pixels each having a grey scale value;

electronically determining a region of interest within said exposed image region;

electronically calculating an x-ray image exposure value for the region of interest from the grey scale values of the pixels in the region of interest;

electronically normalizing the x-ray image exposure value to a signal value, to obtain a normalized value;

electronically determining at least one independent measurement value employed in the x-ray diagnostic apparatus for generating said exposed image region;

electronically mathematically converting said normalized value into a physical unit using said measurement value; and

electronically storing said physical unit in association with said measurement value for documentation.

2. A method as claimed in claim 1 comprising electronically determining said region of interest by electronically dividing said exposed image region into a plurality of areas of equal size, and selecting at least one of said areas as said region of interest.

3. A method as claimed in claim 2 wherein said exposed image region has two perpendicular dimensions, and wherein the step of determining the region of interest comprises dividing said exposed image region into nine areas with three divisions in each of said dimensions.

4. A method as claimed in claim 3 wherein said nine areas include a middle area, and selecting said middle area as said region of interest.

5. A method as claimed in claim 2 comprising selecting a combination composed of plurality of said areas as said region of interest.

6. A method as claimed in claim 5 comprising forming said combination from a plurality of non-contiguous areas.

7. A method as claimed in claim 5 comprising forming said combination from a plurality of contiguous areas.

8. A method as claimed in claim 2 comprising differently weighting the grey scale values of the respective areas.

9. A method as claimed in claim 1 comprising electronically calculating said x-ray image exposure value by forming a mean value of the grey scale values of pixels in said region of interest.

10. A method as claimed in claim 9 comprising electronically discarding a plurality of highest grey scale values in said region of interest and a plurality of lowest grey scale values in said region of interest before electronically calculating said mean value.

11. A method as claimed in claim 1 comprising electronically calculating said x-ray image exposure value by forming a median value of the grey scale values of pixels in said region of interest.

12. A method as claimed in claim 9 comprising electronically discarding a plurality of highest grey scale values in said region of interest and a plurality of lowest grey scale values in said region of interest before electronically calculating said median value.

13. A method as claimed in claim 1 wherein the step of electronically mathematically converting said normalized value to a physical unit comprises employing a mathematical model in the conversion.

14. A method as claimed in claim 13 comprising converting said normalized value to said physical unit by electronically calculating a spectrum of said x-rays striking said radiation detector from a model for a kV value employed to generate said x-rays and an assumed increase in radiation hardness due to filtering of said x-rays and an effect of a patient on said x-rays.

15. A method as claimed in claim 14 comprising calculating a radiation dose as said physical unit.

16. A method as claimed in claim 13 comprising mathematically converting said normalized value to said physical unit comprises obtaining a raster of measurements selected from the group consisting of an actual kV value used to generate said x-rays, a signal strength of the output signal from said radiation detector, and an estimated radiation hardness increase due to filtering of said x-rays and an effect of a patient on the x-rays and interpolating from said raster.

17. A method as claimed in claim 13 wherein said physical unit is a radiation dose, and wherein the step of electronically converting said normalized value into said radiation dose comprises calculating said radiation dose from a linear transformation between said normalized value and said radiation dose.

18. A method as claimed in claim 1 comprising electronically determining said exposed image region directly from the output signal from said radiation detector, with no processing of said output signal from said radiation detector.

19. A method as claimed in claim 1 comprising processing the output signal from the radiation detector, using a processing algorithm, to produce a processed signal, and before electronically determining said exposed image region, electronically operating on said processed signal using an algorithm that is an inverse of said processing algorithm, to restore said output signal of said detector prior to said processing with said processing algorithm.

20. An x-ray diagnostic apparatus comprising:

an x-ray source for emitting x-rays;

a radiation detector on which said x-rays are incident, said radiation detector generating an electrical output signal dependent on the x-rays incident thereon;

an image system supplied with said output signal from said radiation detector for generating an image signal from said output signal;

a display device for displaying an image corresponding to said image signal;

said image system comprising an exposed image region determination unit, supplied with the output signal from said radiation detector, for determining an exposed image region of said radiation detector;

an ROI determination unit, supplied with an output from said exposed image region determination unit, for determining a region of interest in said exposed image region, a first calculation unit supplied with an output from said ROI determination unit for determining an x-ray image

exposure value from the grey scale values of the pixels in said region of interest; and

a normalization unit supplied with an output from said first calculation unit for normalizing said x-ray image exposure value with respect to a signal value, for producing a normalized value, a measurement unit for independently determining at least one measurement value associated with generation of said exposed image region, a second calculation unit supplied with said normalized value and said measurement value for mathematically converting said normalized value into a physical unit, using said measurement value, and a storage unit for storing said physical unit in association with said measurement value for documentation.

21. An x-ray diagnostic apparatus as claimed in claim 20 wherein said first calculation unit determines said x-ray image exposure value as a mean value of the grey scale values of the pixels in said region of interest.

22. An x-ray diagnostic apparatus as claimed in claim 20 comprising a filter for filtering said x-rays with a filter value, and wherein said x-ray source employs a kV value for generating said x-rays and has a mAs value associated therewith, and wherein said measurement device measures said kV value, said mAs value and said filter value as a plurality of said measurement values.

23. An x-ray diagnostic apparatus as claimed in claim 20 wherein said second calculation unit converts said normalized value into said physical unit dependent on a mathematical model, using said measurement value.

24. An x-ray diagnostic apparatus as claimed in claim 20 wherein said measurement unit determines calibration data as said at least one measurement value, and wherein said second calculation unit converts said normalized value into said physical unit from a linear transformation between said normalized value and said calibration data.